(19) World Intellectual Property Organization International Bureau



(43) International Publication Date 24 February 2005 (24.02.2005)

PCT

(10) International Publication Number WO 2005/017588 A1

(51) International Patent Classification⁷:

G02B 6/30

(21) International Application Number:

PCT/DK2004/000555

(22) International Filing Date: 19 August 2004 (19.08.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

PA 2003 01183 60/496,010

19 August 2003 (19.08.2003) 19 August 2003 (19.08.2003)

(71) Applicant (for all designated States except US): NKT IN-TEGRATION A/S [DK/DK]; Blokken 84, DK-3460 Birkerød (DK).

(72) Inventors; and

(75) Inventors/Applicants (for US only): LAURENT-LUND, Christian [DK/DK]; Hollænderdybet, 26, II tv., DK-2300 Copenhagen S (DK). AAEN ANDERSEN, Lars-Ulrik [DK/DK]; Vangebovej 43, DK-2840 Holte (DK).

(74) Agent: NIELSEN, Hans, Jørgen, Vind; NKT Research & Innovation A/S, Group IP, Blokken 84, DK-3460 Birkerød

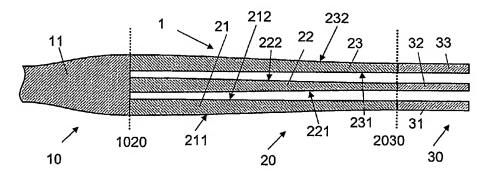
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

[Continued on next page]

(54) Title: INTEGRATED OPTICS SPOT SIZE CONVERTER AND MANUFACTURING METHOD



(57) Abstract: The invention relates to an optical component (1) comprising a combination of optical waveguide elements for modifying the spot size of a mode of an electromagnetic field propagated by an optical waveguide element, the optical waveguide modifying the spot size of a mode of an electromagnetic field propagated by an optical waveguide element, the optical waveguide elements being formed on a substrate. The object of the present invention is to provide a mode coupler with low coupling loss that is easy to manufacture and process tolerant. The problem is solved in that the optical component further comprises a first section (10), comprising a first optical waveguide element (11) adapted to sustain at least one mode of the electromagnetic field, a second section (20) comprising at least two cooperating optical waveguide elements (21, 22), each of said at least two cooperating optical waveguide elements comprising at least one waveguide segment, said at least two cooperating optical waveguide elements being optically connected to said first optical waveguide element of said first section; wherein said cooperating optical waveguide elements (21, 22) of said second section (20) are adapted to maintain optical coupling between said optical waveguide elements to ensure that said at least one mode of the electromagnetic field is sustained by said at least two cooperating optical waveguide elements in cooperation. Preferably, the waveguides of the first and/or second sections are tapered according to a cosine function or to a 5th or 7th order polynomial.